

What is claimed is:

1. A tire with radial carcass reinforcement having beads with a heel portion on an axially inner side and a toe portion on an axially outer side, comprising:

at least one bead wire coated with a rubber mix;

at least one bead filler formed of a rubber mix disposed axially outward and radially outward of the bead wire;

a wedge formed of a rubber mix disposed axially outward of the at least one bead wire and radially inward of the at least one bead filler, the wedge defined by two sides extending from an apex located radially beneath the section of the at least one bead wire, a radially outer side of the wedge defining, with a reference line parallel to the axis of rotation of the tire and passing through the apex, a first acute angle  $\Phi_1$  open radially outside, and a radially inner side forming with said reference line a second acute angle  $\Phi_2$ , open radially toward the inside, the rubber mix having a Shore A hardness of at least 65 and being greater than the Shore A hardness of the rubber mix forming the at least one bead filler;

a first radial reinforcement ply wound on said at least one bead wire to form a first upturn, wherein, when viewed in meridian section, the reinforcement ply is wound about said bead wire passing from the heel toward the toe of said at least one bead, the first upturn engaging the radially outer side the wedge; and,

a second radial reinforcement ply wound on said at least one bead wire, wherein, when viewed in meridian section, the second reinforcement ply is disposed in parallel to the first radial reinforcement ply in a sidewall area of the tire and is wound about said bead wire passing from the heel toward the toe of said at least one bead with a second upturn engaging the radial inner side of the wedge.

2. The tire as claimed in claim 1, wherein the first carcass reinforcement upturn surrounds a total perimeter of the wedge profile, and wherein the second carcass reinforcement is disposed axially outward of the first carcass reinforcement in a sidewall of the tire and the second upturn is surrounded by the first upturn.

3. The tire as claimed in claim 2, wherein the bead wire comprises a solid core wire surrounded by helically wound layers.
4. The tire as claimed in claim 2, wherein the bead wire comprises a wire wound circumferentially to form a multiple turn coil.
5. The tire as claimed in claim 1, wherein the second carcass reinforcement ply is disposed axially inward of the first carcass reinforcement ply, wherein the first upturn extends directly from the bead wire to the radial outer side of the wedge and the second upturn extends directly from bead wire to the radially inner side of the wedge, the first and second upturns arranged in a v-shape.
6. The tire as claimed in claim 1, wherein the first angle  $\Phi_1$  is between  $20^\circ$  and  $70^\circ$  and the second angle  $\Phi_2$  is between  $0^\circ$  and  $30^\circ$ .
7. A tire with radial carcass reinforcement having beads with a heel portion on an axially inner side and a toe portion on an axially outer side, comprising:
  - at least one bead wire coated with a rubber mix;
  - at least one bead filler formed of a rubber mix disposed axially outward and radially outward of the at least one bead wire;
  - a wedge formed of a rubber mix disposed axially outward of the at least one bead wire and radially inward of the at least one bead filler, the wedge defined by two sides extending from an apex A located radially below the at least one bead wire, a radially outer side of the wedge defining, with a reference line parallel to the axis of rotation of the tire and passing through said apex A, a first acute angle  $\Phi_1$  open radially outside, and a radially inner side forming with said reference line a second acute angle  $\Phi_2$ , open radially toward the inside, the rubber mix having a Shore A hardness of at

least 65 and greater than the Shore A hardness of the rubber mix forming the at least one bead filler;

a first radial reinforcement ply wound on said at least one bead wire to form an upturn, wherein, when viewed in meridian section, the reinforcement ply is wound about said bead wire passing from the heel toward the toe of said at least one bead, the first upturn surrounding the perimeter of the wedge and passing back around said bead wire to terminate in the sidewall of the tire; and,

a second radial reinforcement ply disposed in parallel to the first radial reinforcement ply in the sidewall of the tire and terminating radially outward of the bead wire.

8. The tire as claimed in claim 7, wherein the second radial reinforcement ply is located axially outward of the first reinforcement ply and wherein the second radial reinforcement ply is overlapped by the upturn of the first radial reinforcement ply.

9. The tire as claimed in claim 7, wherein the second radial reinforcement ply is located axially inward of the first reinforcement ply.

10. A tire with radial carcass reinforcement having beads with a heel portion on an axially inner side and a toe portion on an axially outer side, comprising:

at least one bead wire coated with a rubber mix;

at least one bead filler formed of a rubber mix disposed axially outward and radially outward of the at least one bead wire;

a wedge formed of a rubber mix disposed axially outward of the at least one bead wire and radially inward of the at least one bead filler, the wedge defined by two sides extending from an apex located beneath the section of the at least one bead wire, a radially outer side of the wedge defining, with a reference line parallel to the axis of rotation of the tire and passing through said apex, a first acute angle  $\Phi_1$  open radially

outside, and a radially inner side forming with said reference line a second acute angle  $\Phi_2$ , open radially toward the inside, the rubber mix having a Shore A hardness of at least 65 and greater than the Shore A hardness of the rubber mix forming the at least one bead filler;

a radial reinforcement ply wound on said at least one bead wire to form an upturn, wherein, when viewed in meridian section, the reinforcement ply is wound about said bead wire passing from the heel to the toe of said at least one bead, the first upturn surrounding the perimeter of the wedge, passing back around said bead wire and extending radially outward to terminate in a shoulder of the tire.

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